THE RE-MAPPING OF THE WORLD.

The "Times" Survey Atlas of the World. Prepared under the direction of Dr. J. G. Bartholomew. Part i. (London: Office of the *Times*, n.d.) Price 2*s*. 6*d*. net.

THE first part of this atlas contains four maps numbered respectively 21, 60, 79, and 95. The parts of the world represented are the southern section of Scotland, Farther India, Lower Egypt (from a little above Luxor), and Mexico and Central America (from Costa Rica inclusive). Three of the maps are, and, no doubt, the majority of those in the atlas will be, drawn on the layering principle, which has the advantages of conducing to clearness and indicating the broad distribution of high grounds and low grounds at a glance. This has been done with a skill worthy of the reputation which the map-making firm responsible for it has long held for work of this class.

The layering adopted is not on a uniform scale. In the same map successive contours represent different intervals of altitude. That, however, we have even in our own Ordnance Survey maps. But there are different scales of altitude on different maps otherwise somewhat similar. On the map of the southern section of Scotland the steps in altitude are by 250 ft. up to 1000 ft., then by 500 ft. to 2000 ft., and after that by 1000 ft. The only isobath is that of 10 fathoms. On two of the other maps the only isobath is that for 100 fathoms, but whereas in Mexico the isohypses represent 100, 500, 1000, 2000, 3000, 4000, 5000, and 6000 ft., and then 8000 and 10,000 ft., in that of Farther India they are at intervals of 500 ft. up to 2000 ft., and then mark altitudes of 3000 and 6000 ft. respectively. In the map of Egypt there are no isobaths (in the main map) or isohypses. Hachures are used to indicate the margins of the plateaux on the inset map showing the environs of Cairo on the scale of 1 : 150,000.

One noteworthy feature of the maps is that they are so mounted as to be suitable for loose-leaf binding, which will have the important advantages of allowing the replacement of a map without replacing the atlas and of enabling one to detach a single map at will for close examination and frequent reference. This feature might perhaps be utilised to remedy one of the defects of the maps, the smallness of the lettering where the names are too crowded. New maps might be drawn for those who would prefer them with fewer names in a larger letter, the missing names being entered in the index with their compass bearing and distance from places that are named on the map, say from railway stations, which are very easy to find.

We are promised an index of more than 200,000 names, but are not told how the index is to be prepared. Presumably latitude and longitude are to be given, as there is no provision on the border for reference by letter and number to the degree rectangles. But if latitude and longitude are to be the means of reference, or, indeed, in any case, we hope that the maps still to be issued will have the divisions of degrees marked on the border. That is not done in the four maps of the first part, with the result that in Scotland, for example, we have an interval for latitude of one degree measuring 6¾ in. without any subdivision showing minutes. On each map also the projection used should be named.

PHYSICS FOR MEDICAL STUDENTS.

(1) *A Manual of Physics.* By Dr. J. A. Crowther. Pp. xx+537. (London: Henry Frowde and Hodder and Stoughton, 1919.) Price 16*s*. net.

(2) *Elements of Physics.* By Dr. R. A. Houstoun. Pp. viii+221. (London: Longmans, Green, and Co., 1919.) Price 6*s*. net.

STUDENTS of medicine are apt to regard physics as a subject outside the range of their medical studies, a subject imposed upon them by certain grandmotherly examining authorities, to be forgotten as soon as the examination is over. Teachers of physics have to contend not only with this attitude of mind, but also with the fact that writers of physical text-books for the most part show but little evidence of sympathy with the medical applications of their subject. The ideal text-book for medical students would be written by a trained physicist who has specialised in medical work and is imbued with the spirit of research in physics as applied to medicine. Instead of studying the common steelyard, the medical student might then find the principle of the lever illustrated in the human frame, and instead of having to wade through a chapter on terrestrial magnetism, he might be given further information on the subject of meteorological physics and the conditions determining climate. He might even learn something as to electric oscillations applied in high-frequency treatment, or as to the use of a saccharimeter. Both the volumes under review claim to meet the needs of first-year medical students, but the ideal book on physics for such students has yet to be written.

(1) Dr. Crowther has given us an excellent manual of physics suitable for beginners who have no special profession in view. He has devoted considerable space to the subject of

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mechanics, and experienced teachers will agree that "a thorough grounding in this most fundamental of all the sciences is the beginning of all wisdom in physical knowledge." The treatment of the various subjects follows conventional lines, a short chapter on the discharge of electricity through gases being the only one which deals specifically with the results of modern research. The style is lucid and interesting, and the explanation of physical principles exceptionally clear. It is to be regretted that the price of 16*s*. net should be so high as to make it impossible for many students to purchase the volume.

(2) A smaller treatise on the elements of physics has been written by Dr. Houstoun, who has attempted to cover the same ground in less than half the number of pages. The matter is consequently somewhat compressed and the style curt. The author has been successful in including a section on simple harmonic motion, which is so important in the study of vibrations; and another on the characteristic features of wave motion, in which the difference between a stationary and a progressive wave is well brought out. The work should be useful as giving a compact systematic treatment of the whole subject.

Both books are furnished with useful collections of questions and problems, and answers are provided for the numerical examples.

H. S. ALLEN.

OUR BOOKSHELF.

Harmsworth's Universal Encyclopedia. Edited by J. A. Hammerton. No. 1. Pp. xix + 128. (London: The Amalgamated Press, Ltd., 1920.) Price 1*s*. 3*d*.

THIS is, of course, a work of reference for the general reader, not the expert. The editor claims that it possesses the three necessary qualities, comprehensiveness, conciseness, and accuracy. All three are relative terms, and there is no absolute test by which his claim can be judged. But, since Mr. Hammerton is the acknowledged authority on What the Public Wants, the first claim may be conceded without further question. On the second the bare statement that A—*Afranius* occupies 128 closely printed but well-illustrated pages will enable the reader to judge for himself. On the third it is sufficient for NATURE to record that the scientific articles appear all to be as completely accurate as the space allotted to them will permit, and that one of the introductory articles, by Lord Moulton on "Science and the Future," is a model expression of the obvious; originality or profundity could not be expected.

We think the production is one of which the Amalgamated Press may well be proud.

LETTERS TO THE EDITOR.

[The Editor does not hold himself responsible for opinions expressed by his correspondents. Neither can he undertake to return, or to correspond with the writers of rejected manuscripts intended for this or any other part of NATURE. *No notice is taken of anonymous communications.]*

Relativity and the Displacement of Fraunhofer Lines.

IN view of the uncertainty in the interpretation of Einstein's equations in the matter of the displacement of solar spectrum lines, and of the hope which has been expressed that experimental spectroscopic evidence may be forthcoming which will settle the point at issue, it may be of interest to give a brief account of the present state of the problem from the experimental point of view. There are really three questions to which answers are required:—(1) Is there any means whereby the displacements of solar lines relative to those of terrestrial origin may be disentangled from such disturbing causes as pressure, varying arc conditions, density gradients, etc.? (2) If so, what do the outstanding displacements amount to? (3) To what extent are they due to gravitation and line-of-sight motion respectively?

Upon (1) it is to be remarked that, since both gravitation and motion displacements vary directly with the wave-length, they are indistinguishable spectroscopically; moreover, the possibility of separating their sum from those due to other causes, which in general displace spectrum lines (I have enumerated some ten possible causes in a recent communication to the Royal Astronomical Society), depends upon the reputed invariability of the wave-lengths of the cyanogen bands in different parts of the arc, under pressure under varying current densities, etc. Practically all other lines are affected by one or more of these influences, and must be ruled out of account. Further laboratory experiments are necessary before the cyanogen bands can be regarded as suitable criteria, particularly in view of a recent statement from the Bonn Laboratory that they are unsymmetrical, which for well-founded reasons brings them seriously under suspicion for astrophysical purposes.

Even if we assume for the present that the cyanogen bands are satisfactory standards, (2) presents a further difficulty in that the Mount Wilson observers find displacements varying from 0 to about one-third of that predicted by Einstein; whereas Evershed and three Continental observers find a displacement of about one-half the required amount. It is possible that the discrepancy is due to the observations being made on different dates, since at Kodaikanal, on different occasions, measures made at the pole of the sun varied from one-half to the full predicted displacement. Simultaneous solar observations at Kodaikanal and Mount Wilson are, unfortunately, impossible, and it is a pity that the Australian Solar Observatory is not yet in existence to link up the two.

If Mr. Evershed and others prove correct, the problem still remains to interpret the half-displacement observed; obviously, this can be done only if by some independent evidence the motions of the vapours are known upon that portion of the solar surface towards which the spectroscope is directed. This involves a deeper knowledge of the currents in the solar atmosphere than we at present possess. There has been a disposition to regard displacements at the polar limb as free from motion effects, but it is inevitable that there will be surface currents, and these need not be of excessive violence in order to give displacements of the order of magnitude of those observed. The problem, if we accept Mr. Evershed's

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